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ABSTRACT

This booklet describes steps that are useful for education organizations to follow when planning for, designing, and implementing an automated student record system. Following a general discussion about student records and student record systems, the following steps to consider when developing and implementing an automated student record system are described: (1) determine the desired uses of the system; (2) identify federal, state, and local regulations affecting the maintenance of student records; (3) select the overall contents of the system; (4) select the data elements to be kept in the system; (5) select a system for assigning a unique identifier to each student; (6) determine the physical design of the system; (7) identify the format for the data within the system; (8) determine how you will enter or import data into the system; (9) determine your procedures for providing access to the system; (10) plan ways to ensure the integrity of the data in the system; (11) plan procedures for doing standard and ad hoc analysis and reporting; and (12) develop procedures for appropriate reporting of student data. Examples, case studies, and checklists are included. Several print and online resources are listed. (MES)

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Building an Automated Student Record System

A Step-by-Step Guide for Local and State Education Agencies

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NCES 2000-324

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Dear Colleagues,

The purpose of this document is to provide a stand-alone guide for local and state education agencies faced with the task of designing a new or upgrading an existing automated student information system. While based on a chapter from the Student Data Handbook for Elementary, Secondary, and Early Childhood Education, this guide contains additional information from a variety of resources, most of which are cited in the text. Included in the contents are guidelines, checklists, and real-life examples.

This document was commissioned by the National Education Statistics Agenda Committee (NESAC) of the National Forum on Education Statistics (a part of the National Cooperative Education Statistics System) and funded by the National Center for Education Statistics (NCES) of the U.S. Department of Education.

Through contract with the Council of Chief State School Officers (CCSSO) and NCES funding, this document was developed by Barbara S. Clements of Evaluation Software Publishing, Inc. It is an adaptation of the chapter, Building a Student Record System, contained in the Student Data Handbook for Elementary, Secondary, and Early Childhood Education: 2000 Edition. Beth Young of NCES and Oona Cheung of CCSSO provided overall guidance to and management of this activity. Comments on the text were gratefully received from state and local education agency staff including Raymond Yeagley, Rochester (NH) School District, Lee Tack, Iowa Department of Education, Bethann Canada, Virginia Department of Education, and Carol Hokenson, Minnesota Department of Children, Families, and Learning. Design assistance was provided by The Creative Shop.

The original Student Data Handbook was developed in 1994 by NCES. It was the result of the collaborative effort and work of NCES staff and contractors, the NESAC Student Data Task Force, local, state and federal education representatives and researchers from around the country.

We hope this document will provide you with useful and interesting information to aid in designing your automated student record system.

Patti High
Oklahoma Department of Education
Chairperson
National Education Statistics Agenda Committee

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National Forum on Education Statistics

Building an Automated Student Record System

A Step-by-Step Guide for Local and State Education Agencies

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National Forum on Education Statistics

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National Center for Education Statistics
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Introduction

The national focus on student outcomes has placed an additional burden on our nation's schools, school districts, and state education agencies, for they must monitor the achievement of individual students, as well as groups of students, and show that all students are meeting high standards for learning. An education organization's ability to meet this challenge is affected by the organization's access to complete, accurate, and timely information about its students. This booklet has been developed to help education organizations plan and implement efficient systems for maintaining and using individual student records so that effective decisions can be made for the benefit of the students.

Many schools, school districts, and state education agencies already collect and use data effectively. However, the proliferation of new reporting requirements and dramatic changes in technology have had a profound effect on the need for student data and the education community's ability to manage student records. Purchase of more powerful computer hardware and software and the reconfiguration of information systems have become essential components in efforts to meet the needs of all students.

There is probably no single best information system solution that can meet the needs of all 90,000+ public schools, 16,000+ school districts, 27,000 private schools, and 57 education agencies in states and outlying areas. However, there are certain steps that could help all education organizations to determine the best solution for their particular situations. This booklet can lead education organization decision-makers through the process of making the best and most cost-effective decisions about information management systems devoted to individual student records.

Purpose of this Booklet

Building an Automated Student Record System describes steps that are useful for education organizations to follow when planning for, designing, and implementing an automated student record system. This booklet should be particularly useful if your school or district is moving from paper records to automated student records or if you are revising or replacing an existing system. In addition, you may find information that is useful if your state education agency is building a new student record system or expanding the collection of individual student records.

The information in this booklet provides guidance concerning:

- the development of an efficient and effective automated student record system,

To help promote student achievement and success, education organizations must have access to complete, accurate, and timely information about students.

This booklet provides guidance on building an effective automated student record system.



Guidelines, case studies, and checklists help the reader make decisions about student record systems.

- the selection of appropriate procedures and security measures needed to maintain the automated student record system, and
- appropriate uses of an automated student record system.

Contents of this Booklet

Included are twelve steps to consider when developing and implementing an automated student record system. Many of these steps are relevant to the implementation of any administrative record system, but our focus here is on the special considerations relating to student records, including confidentiality and access.

After a general discussion about student records and student record systems, each step is described. Examples, case studies, and checklists are included to help you work your way through the steps and make crucial decisions. Related resource documents will be described for some of the steps.

It should be noted that this book is derived from: a chapter that appears in the National Center for Education Statistics' (NCES) *Student Data Handbook for Elementary, Secondary, and Early Childhood Education: 2000 Edition*. In addition, information from other documents developed or sponsored by NCES and the advisory group, the National Forum on Education Statistics, are referenced and parts included in this booklet. Each of these documents is described in the Resource List at the end of the booklet, along with ways to obtain copies of the printed documents or the online versions.

Description of Student Records

A student record is, by definition, any written information about a student. Student records can be described in terms of their contents (e.g., courses taken, grade point averages), use (e.g., identifying students eligible for the free lunch program), and storage medium (e.g., a manila file folder). The maintenance of extensive, accurate, historical, and current data about individual students is essential to the functioning of schools and school districts, and can promote effective educational practices at all levels of the education system.

The contents of the student record are determined by the uses of the records. Typical contents may include family information, courses taken and grades, special program participation information, immunization records, assessment scores, extracurricular activities, and other information that is used by the education system to promote student success and provide appropriate services. Some of this information should be standard across classrooms, schools, districts, and states, while other information can be unique to the particular classroom, school, or district.



Student records are used for many important educational purposes, including instruction and guidance decisions; monitoring compliance with attendance and health laws; and administrative purposes, such as determining tuition status, scheduling students into classes, planning school bus routes, monitoring program completion, and completing reports for local, state, and federal authorities. The student record usually contains the information necessary for each of these purposes at the school or district level. Instructional management systems are frequently linked to student record systems to provide more analytical capability for teachers and administrators. These systems allow for student learning plans, individualized education plans (IEPs), portfolios, and other student products to be stored and retrieved for instructional decision-making and achievement monitoring.

A student record may be kept on file in a classroom, school office, school district office, intermediate agency, state education agency, or other approved location. The record may contain information collected from the student (or family); from teachers and other school staff; and from other sources outside the school, such as health care providers or testing companies. The record for a student may be stored in a central location (such as a school computer) for the convenience of anyone with authorized access and a need to obtain information; or there may be a separate paper or computer record maintained by each person who has contact with a student. Some parts of the record may even be stored outside the school, as happens when student health records are stored and maintained by the local public health service, or when state test scores are stored and maintained at the state education agency. No matter where the student records are stored, procedures must be in place to ensure that access is granted only to authorized individuals and that only authorized individuals have the capacity to maintain (update) the records.

Student records traditionally have been kept only at the school or district level. In recent years, however, many state education agencies have begun to collect individual student records. State-level records typically consist of data about student characteristics, program participation and assessment results—a subset of the data usually maintained at the school and district levels. The purposes of state-level databases are to promote continuous improvement in schools, plan for program changes to help students achieve high standards, distribute funds, and hold schools and districts accountable for student achievement. Most of the information included in state-level databases comes directly from schools and districts, and the information may be transmitted electronically among levels of the state's school system.

In summary, a complete student record may be a single file, or it can be made up of several separate records, each with specific content or uses and each stored and maintained in a different way.

Student records contain information needed to make effective decisions about instruction and student services.



Description of a Student Record System

Student records are often viewed as paperwork produced for the education bureaucracy. However, a well-designed student record system, whether using paper documents or automated systems, yields many benefits. The most important of these is the ability to report information for decision making about individual students, schools, programs, and school districts. A second benefit, particularly with automated systems, is efficiency in processing and exchanging student records among schools. When student records are added to an overall management information system that includes information on staff, materials, and budgeting for the school or school district, more management activities can be accomplished and efficiency will be improved. Student record systems, thus, play a key role in the overall functioning of the education system; but more importantly, they increase a school's ability to meet the needs of students.

Separate student records become a student record system when they are linked together or made accessible to perform one or more critical functions. These functions may include generating reports, adding/deleting/changing records, and conducting analyses. Like individual student records, student record systems may be housed in several ways: as paper files in filing cabinets, on microfilm, in computer files, or in a combination of methods. To improve the efficiency and usefulness of data, many schools, school districts, and state education agencies have entered their student records into automated databases. Automated systems using available computer technology offer tremendous advantages over traditional paper systems. However, most computerized systems still rely on paper records at various stages within the system.

Numerous companies offer software products designed to store and provide access to student information. Often these products include administrative applications that handle course scheduling, transportation planning, and other useful activities. Sometimes there are instructional applications that work in conjunction with administrative applications to record and analyze student progress. Many of these software companies have developed their student record system products with the assistance of local educators from various different school districts. Other student record systems have been developed by district staff or consultants for a specific school, district, or state education agency (often called proprietary systems using custom software). Each institution or agency seeking to maintain individual student records must determine the best system design and software solution for its organization. An important consideration is the maintenance of the system as changes or improvements are needed, as well as what it will take to keep the system working on a daily basis. The information that follows can help your organization identify and implement the most appropriate automated system.

Effective student record systems use computer technology to maintain longitudinal information about individual students served within an education system.



Benefits of a Well-Designed Automated Student Record System

A well-designed automated student record system will reach more than teachers and administrators. It will also benefit the students, parents, community, legislators, and others by providing information on the functioning and success of the education system. Some of the most important advantages are discussed below.

► Cost savings and cost avoidance

A well-conceived and implemented automated student record system can reduce the costs of handling the paperwork associated with record keeping. Even when such a system proves initially expensive and actual reductions in current costs are not achieved, it is justified given future savings and efficiency. Nevertheless, system developers and implementers have to contend with two major concerns in order to maximize the cost-saving benefits of an automated system. First, it is sometimes thought that automated data systems do not result in actual savings. Granted there are computer purchase costs and personnel needed to maintain the system. These costs, while not minimal, should pay for themselves with the usefulness of the data and the reduced time data providers have to spend on data collections. Concerns about the reliability of computers may also lead some staff members to continue keeping their old records, "just in case." In fact, during the early stages of automating data it is often wise to maintain the data in two places, so that glitches can be resolved before relying solely on the automated system. Once the system is fully functional, however, the back-up paper system is no longer needed. Another mistake often made is that organizations automate a paper system instead of completely redesigning a system that takes advantage of the computer's capabilities as they exist now as well as thinking about future possibilities. Reconceptualizing a system that contains virtually no paper means that redundant activities such as entering data can be avoided. If, however, you merely automate the paper system, you may achieve fewer savings than could be achieved through a newly-conceived automated system.

► Quicker response

When information from a student record is requested, it is usually needed promptly. A principal making placement decisions about a new student needs the previous school's records immediately to assign the student to the appropriate programs and services. A counselor with a student in crisis needs immediate access to records to help intervention specialists effectively deliver their services. A school board making a policy change to a "no-pass/no-play" rule needs analyses to support its decision. A well-designed student record system allows for timely retrieval of needed information in these, or similar, situations.

A well-designed student record system ensures that data are readily available to manage the education system efficiently and to effectively meet the needs of students.



► Accuracy

Data quality is basic to a well-designed student record system. Having clearly defined data elements that are used consistently promotes data quality. Paper records have traditionally been considered accurate, although not necessarily complete or accessible. Maintaining data quality as information is shared, analyzed, and reported is a characteristic of a well-designed system. Accuracy is vital at every stage, from data collection, to entry, to maintenance in the system. Accuracy provides users with the confidence they will require to rely upon a student record system.

► Getting the needed information

An effective automated student record system should provide the information required on request, easily, and without burdensome trial-and-error searching. From the first steps of designing the system, the queries that will follow are anticipated and accommodated. Similar to an office filing system, the adequacy of a student record system is often judged by how much time and effort are required to find and retrieve information. Therefore, a key part of the design of a student record system is its process for access, retrieval, and reporting.

► Moving data among different education agencies

A well-designed automated student record system allows for the easy and efficient movement of student records among levels of the education system using standard formats. For instance, when a student moves from one school to another within the same district, or to another district, the information can be extracted, prepared, and transferred electronically. The school receiving the electronic record can download the student record, thus eliminating the need for re-entering the information. Electronic data can also be received more rapidly than paper documents, enabling quicker decision-making about the student. Such a system can also be used to transmit student records to a state education agency that collects individual student records. It can also be used to transmit student transcripts to postsecondary institutions where a student is seeking admission.

As you can see, there are many advantages to having an automated student record system. The move from paper-based record systems to automated systems, or the upgrade of existing automated systems, means that there is a greater chance that information will be readily available when important decisions must be made about improving educational programs and services. Once the decision is made to upgrade your system, the next step is look at the process needed to design and implement an effective student record system.



Steps for Designing and Implementing an Automated Student Record System

The recommended process for designing or redesigning an automated student record system is described below. These twelve steps detail the sequence to use and the issues that should be resolved when identifying the solution for your education organization. As with most systems, however, these steps and their associated issues are never fully resolved because the whole process is ongoing. The standards and principles upon which the system is designed will have to be continually monitored and revised as needed by an organization.

Careful attention to these steps will help to ensure that important issues are resolved and implementation facilitated.

1. Determine the desired uses of the student record system.
2. Identify federal, state, and local regulations affecting the maintenance of student records.
3. Select the overall contents of the student record system.
4. Select the data elements to be kept in the student record system.
5. Select a system for assigning a unique identifier to each student.
6. Determine the physical design of the student record system.
7. Identify the format for the data within the student record system.
8. Determine how you will enter or import data into the student record system.
9. Determine your procedures for providing access to the system.
10. Plan ways to ensure the integrity of the data in the student record system.
11. Plan procedures for doing standard and ad hoc analysis and reporting.
12. Develop procedures for appropriate reporting of student data.

**Steps for
designing and
implementing
a student record
system**

The support of the organization is critical to successful implementation of a student record system. Data are not free. Organizational resources, including manpower, dollars and time, must be dedicated to the design, collection, processing, analysis, and reporting aspects of the student record system. Ongoing maintenance, operations, and training must be planned and funded from the beginning. Policies and procedures are needed that will provide for sound management of the system and elicit the highest quality, most accurate data from system users. Finally, users – those who will enter, analyze, and otherwise access the data – must be prepared to effectively maintain and utilize the system. Effective management will ensure that their concerns and needs are addressed in decisions made about the system, and will provide for training to ensure effective usage of the system.



STEP 1

Determine the desired uses of the student record system.

A critical first step is the needs assessment. You should attempt to identify all potential system users and bring them together to determine the most important uses and desirable features of the student record system. This will help to determine your response to each of the next eleven steps. It is not critical to identify all of the potential uses; when your system is up and running, you may find many new uses for the system. It is, however, important to identify as many uses as possible, so you can ensure that the system will contain all of the data you need, will provide for all of the analyses you need to do, and will be flexible enough to meet your changing needs. To help you identify all potential uses, you may want to convene a committee consisting of representatives of the different types of people who will be users of the system once it is in place, or those who are currently using the existing system. Examples of potential users are principals, counselors, teachers, and researchers/evaluators. With the assistance of your committee, you should prioritize the uses and develop a statement of purpose and objectives.

Student record systems are generally used for one of three main purposes:

- ▶ To support administration of the education organization.
- ▶ To provide data needed for state and federal reporting.
- ▶ To evaluate the quality and effectiveness of educational programs.

Step 1a. Identify uses of the system.

The student record system should have multiple uses and meet the needs of different types of education staff. At the local level, counselors use student records to make decisions about courses a student should take and to assist with problems that may arise. Teachers use student records to help make instructional decisions and to obtain specific information that may assist in working with a student. Principals and other school district officials use aggregate data obtained from student records to make policy decisions and to plan curriculum, instructional services, staffing, and facilities. Research staff use student data to evaluate the success of various programs and interventions. Reporting to the school board, parents, and the public is another use. Many state education agencies collect individual student records for all of the students in the state to assist with monitoring accountability and future planning.

Perhaps the most critical use of student records is the decision making about instruction and services to be provided to the student. Ensuring that the student's record follows him or her when a school change is made is essential.



The adoption of a coordinated student record system within a school district can help to ensure that students' records are transmitted to receiving schools when they move or are promoted to a different school.

Transmitting student records electronically across district lines and to postsecondary institutions is facilitated by the adoption of a standard format for sending and receiving student records. A nationally recognized standard format is called SPEEDE/ExPRESS (SPEEDE stands for Standardization of Postsecondary Education Electronic Data Exchange, and ExPRESS stands for Exchange of Permanent Records Electronically for Students and Schools.). Developed through a consensus process by representatives of elementary/secondary and postsecondary education, SPEEDE/ExPRESS is a standard format for the contents of a student transcript and other related information (e.g., health conditions) that should be forwarded when a student moves to another school or applies to a postsecondary institution. SPEEDE/ExPRESS was developed to facilitate rapid, direct electronic exchange of student records between computers. The SPEEDE/ExPRESS format increasingly is being used by postsecondary institutions and even some businesses for sending and receiving student records. While not yet widely adopted at the K-12 level, there are some school districts that transmit student records in the SPEEDE/ExPRESS format to postsecondary institutions. [See the Resource List for information on how to learn more about SPEEDE/ExPRESS.]

Florida's Solution for the Transmission of Student Records

The state of Florida is committed to the efficient exchange of student information among education organizations. To this end, it has developed a proprietary format for the electronic transmission of student records among elementary, secondary and postsecondary schools. In order to allow for electronic transmission across state lines, the proprietary format has been crosswalked into the SPEEDE/ExPRESS format at the state level. Thus, students applying to the University of Texas at Austin from the Dade County (FL) School District can have their transcripts sent electronically to the Florida Information Resource Network where it is translated into the SPEEDE/ExPRESS format for transmission to the University of Texas. Other states are now looking at state-wide adoption of SPEEDE/ExPRESS for the transmission of student records outside of district boundaries.

***The identification of
user needs is essential
to the selection of the
most appropriate data
system solution.***



A graphic for Step 2, featuring the word "STEP" in a white box on a black background, followed by a large white number "2" on a black background.

Step 1b. Prioritize uses.

Once users have been polled and critical uses identified, it is a good idea to rank them from essential to optional. There may be resource limitations (e.g., money, computer capability, or staff) that cause you to implement your system in stages, so identifying essential uses will help you to know where to begin. Timing is also a critical aspect, as there are periods of time in school calendars that are too busy to implement new activities.

Step 1c. Develop a statement of purpose and objectives.

At this point, you may want to develop a statement of purpose and objectives for the student record system, so that all potential users (and even non-users) will know what the system is expected to accomplish. In this statement, you should list any logical connections with other administrative software as well as describe how it fits into your organization's overall information technology plan.

Different uses may call for a design with separate files, or separate areas within a file, but the ability to integrate information across locations is necessary. Step 1 merely delineates and describes all the potential uses of the student record system. With these uses ranked from essential to optional, Step 2 can begin.

Identify federal, state, and local regulations affecting the maintenance of student records.

Each use that you identify has its own set of regulations, and the system must be designed to comply with these laws, rules, policies, etc. Regulations may mandate or determine the response to any or all of the next ten steps.

The Family Educational Rights and Privacy Act (FERPA) is a federal law that restricts access to individually identifiable student records and gives parents a right to view what is kept in their children's records. Because of this law, there are many restrictions and security measures you must plan to implement. There is more discussion about these restrictions and measures in Step 9. In addition, essential information for developing procedures and policies related to student records can be found in the NCES document, *Protecting the Privacy of Student Records: Guidelines for Education Agencies*.

Some states that have implemented student record systems have worked with their states' Attorneys General to ensure that no relevant laws are being broken. Many states have indicated that they have confidentiality laws that affirm or extend FERPA. No state may have a law more lenient than FERPA, but a state may impose greater restrictions on the release of student data. These restrictions must be addressed in developing a student record system.

To ensure that legal requirements are met and ethical responsibilities carried out appropriately and effectively, education agencies and institutions

are advised to establish their own written policies and guidelines for maintaining the privacy and confidentiality of student records. Such policies and guidelines should state the principles and procedures for addressing the following issues:

- Selecting appropriate data elements for student records.
- Accurately, consistently, and carefully collecting these data elements.
- Maintaining relevant, accurate, and confidential records.
- Carefully screening anyone that will handle confidential information.
- Restricting access by school personnel.
- Safeguarding data (or restricting access) while data are in the possession of a contracting organization.
- Safeguarding individual student records being transferred to other schools, local education agencies, state education agencies, and elsewhere.
- Transferring personal information to an authorized third party only on the condition that this third party not permit access to any other party without the written consent of the student or parents, as appropriate.
- Concealing the identity of individuals or institutions desiring or entitled to confidentiality, through appropriate procedures for aggregating, encoding, and releasing sensitive data.
- Destroying records or data that are no longer needed.

Many of these areas are described more fully in the steps that follow.

Education agencies and institutions may want to establish and maintain an oversight committee to produce and review policies, procedures, and activities involving student records. The membership of this committee might include appropriate representatives of such groups as students, parents, teachers, counselors, principals, the board of education, and the general public. This committee should be assigned responsibility for ensuring that student data are collected, updated, stored, accessed, used, and discarded in such a way that:

1. The rights and welfare of students are adequately protected.
2. The potential benefits to students of any particular record use outweigh the potential risks.
3. Informed consent is obtained from students or parents, by adequate and appropriate methods, for including certain data in student records and using (or releasing) the data for specified purposes.

Every education agency or institution should periodically reassure itself, through appropriate administrative overview, that the policies and procedures related to student records and designed to protect its students' rights and welfare are being applied effectively.

Review local, state and federal regulations regarding student records to ensure that safeguards for confidentiality are implemented.



Meeting Resistance to Student Records at the State Level

Some state education agencies have met extensive resistance to the collection of individual student records at the state level. Parental concerns about educator access to student records is a serious issue, and must be addressed in order to be successful in the development of an effective state-level student record system. Successful states have carefully documented their planned uses of the data, as well as stating what they do not intend to do with the records. They have obtained the support of state officials for the collection of student records; and they have carefully designed systems for ensuring secure transmission of student records to the state education agency as well as secure maintenance within the agency. Comprehensive documentation is essential.

STEP 3

Determine what types of data will be needed based on the potential uses you have identified.



Select the overall contents of the student record system.

Identifying the contents of a student record system is a very important step in designing a system. It is important to identify the data categories that are essential to the functioning of the education system. It is also important to look at reporting requirements to see what data must be provided. Then, you can make plans to collect and maintain the data needed for each data category. As was mentioned before, an important role of a student record system is to provide educators with the information they need to make decisions about providing instruction and services to individual students and groups of students. A good place to start is to think about what are the different types of decisions that have to be made about students.

Uses and regulations together help to determine the contents of a student record system. Data categories are the areas of information to be kept or excluded. Typical data categories included in school and district student record systems are:

- Personal information (e.g., student and family background).
- Enrollment and attendance information.
- School participation and activities (e.g., courses taken, grades).
- Non-school and post-school experience (e.g., planned college attendance).
- Assessment information and results.
- Transportation.
- Health conditions.
- Special program participation and student support services received.
- Discipline information.

It should be noted that certain data, such as data about staff and schools, are not generally kept in the student record, but rather are available to be merged or linked with student data for certain types of analyses.

The desired categories should be clearly defined before beginning Step 4 to ensure that all areas are covered in the student record system and to eliminate unnecessary duplication. A key to achieving the benefits described earlier is to enter data once by having one single place to enter or update each type of data. This will ensure that data elements needed for more than one purpose are not maintained differently in various files.

Selecting Data to Collect

One state education agency held many meetings to decide what categories of data it wanted to receive in the individual student records it would be collecting from schools. Among the types of information it hoped to obtain were data related to student participation in various state and federal programs, assessment data, and demographic data. A long list of data elements was identified, far longer than the Department knew was practical when just starting to collect student records. With the assistance of various committees, the Department was able to prioritize the data elements into two levels, essential and desirable. Department staff decided to begin collecting only the data elements identified as essential.

Select the data elements to be kept in the student record system.

Each data category should be further divided into individual data elements. A data element is the lowest level of information contained in a record. For example, in the data category "student background," race/ethnicity, sex, birthdate, and English language proficiency would all appear as data elements.

Data elements should be selected for one of the following reasons:

1. The data are needed for administrative purposes to ensure an effective education system.
2. The data are needed for reporting to school boards, state boards of education, and state and federal education agencies, as well as to parents and teachers.
3. The data are needed to evaluate the quality of the instruction and services being provided.



The document, *Basic Data Elements for Elementary and Secondary Education Information Systems*, describes the criteria for identifying needed data elements.

**Criteria for
evaluating the
quality of data
elements**

When you are selecting the data elements for a student record system you must remember that data should not be collected if they are not needed or if their accuracy is suspect. Also, you should look to see if the data you want are available from other reliable sources. In particular, sensitive student data should not be collected unless an important purpose is being served.

The document, *Basic Data Elements for Elementary and Secondary Education Information Systems*, describes procedures that can be used to select data elements for an education information system, as well as a listing of desirable student and staff data elements. In this document, the following criteria were specified for selecting data elements.

1. **The data element should be collected on a regular and timely basis.** The data element should be one that is gathered and used on a regular basis. There is no efficiency in standardizing an element that reflects a one-time need or an unusual bit of information. In addition, the collection of this data element should occur at a time that is appropriate for the intended users.
2. **The data element should be reliable.** The data should be a consistent measure for every entity (such as individuals, schools, or districts) and from one time to another.
3. **The data element should be valid.** The data should measure what they purport to measure. A data element should reflect a logical and meaningful description of an entity, for example, an individual, a school, or school district, and it should not be easily subject to distortion.
4. **The data element should be quantifiable or measurable.** The data to be collected can be defined, listed, codified, or otherwise described in a consistent, readily interpretable manner.
5. **The data element has been consistently defined by a recognized body.** The data element should have a standardized definition so that data can be collected in a reliable manner. This definition should be one that is available from a legitimate professional source and is generally accepted by the field as appropriate.
6. **The data elements together provide for valid measures of desired indicators.** Desired indicators include measures of student or institutional performance, equity, and efficiency.

Maintaining huge quantities of data about students in a single locale can be dangerous unless appropriate safeguards are in place. Training and access controls are essential to ensure that only those with a "need to know" have access to the student records, and that the data are not shared inappropriately. This will be discussed in more detail in Step 9.



A critical aspect of this step is the definition and coding of data elements. To the extent possible, it is advisable to refer to documents containing standard definitions for data elements to assist you in this effort. The use of standard data element definitions across education organizations helps to ensure that data will be comparable and, thus, more useful. The *Student Data Handbook for Elementary, Secondary, and Early Childhood Education* was developed by the National Center for Education Statistics (NCES) specifically to promote the use of standard terminology and data elements. This handbook contains a comprehensive listing of data elements that might be used in a student record system. In addition to definitions, there are related entities listed, code tables for some of the data elements, and recommendations for computer formatting.

Another detailed effort to identify what data elements should be included in a student record is the SPEEDE/ExPRESS electronic transcript format, mentioned in Step 1a. SPEEDE/ExPRESS contains a standard set of data elements and formats. The SPEEDE/ExPRESS data elements and formats are consistent with the data elements included in the *Student Data Handbook for Elementary, Secondary, and Early Childhood Education*, although not always identical. This standard transcript format could be used as a suggested set of data elements to be included in a student record system.

Another standard-setting activity is relevant to this discussion. The Schools Interoperability Framework (SIF) is a technical blueprint for educational software that can ensure that diverse software applications will work seamlessly together. This format is being developed by a group of software vendors under the sponsorship of the Software and Information Industry Association. Knowing about these standards can help system planners and designers to make decisions that will promote interoperability among administrative applications (e.g., financial management, transportation, and cafeteria management) and instructional applications. [See the Resource List for information on how to learn more about SIF.]

One more effort is worthy of discussion here. NCES sponsored the development of standard codes for secondary school courses. Contained in *A Pilot Standard National Course Classification System for Secondary Education* are codes for the most frequently occurring secondary school courses. This system is meant to aid schools, districts, and states in standardizing course codes so that students moving from one school to another can be more efficiently assigned to the correct courses. Standardized course codes also facilitate the comparison of course-taking patterns of students.

When developing or redesigning a student record system, adopting standards that have been set at a state or national level, or those of a specific vendor's software, provides for more straightforward exchange of data across systems. As more national standards develop, maintaining a match between local records and those standards will allow schools to take advantage of automated exchange methods. With the emergence of national standards and definitions, student record systems within separate education agencies will

Collecting data according to standard definitions and formats will help promote accuracy, consistency and usefulness.



The Student Data Handbook for Elementary, Secondary, and Early Childhood Education contains a comprehensive listing of data elements you may want to consider collecting.

**Characteristics
of a data element
to list in your
data dictionary**

become part of a larger system of student records. This does not mean there cannot be local flexibility in the selection or structuring of data. It simply means that for data elements that will be shared, it is best to use consistent definitions, preferably in common use. This will help to ensure that information will be accurately interpreted when it is shared or analyzed.

Once you have identified the desired data elements for the system, it is a good idea to develop a data dictionary containing details about each data element and how it will be collected and maintained. Following is a list of types of information you might include in your data dictionary.

- | | |
|--|---|
| ■ Full title of the data element | ■ Required/Optional |
| ■ Definition of the data element | ■ Format in database |
| ■ Code list or list of options | • Data element type |
| ■ Date collected and any other relevant dates | • Field length |
| ■ Source of the data | • Delimiter type |
| ■ Update requirements, including automated updates | ■ How to handle missing data |
| ■ Purpose of the data element | ■ Security level |
| • Reporting requirements | ■ Related data elements |
| • Potential uses | ■ Mandate for collection |
| | ■ Reports in which the data are presented |

Using the Handbook to Pick Data Elements

Several states, such as California, Nevada, and Massachusetts, have used the Student Data Handbook for Elementary, Secondary, and Early Childhood Education as the source document for deciding what data elements to collect on individual students. The 2000 Edition of the Handbook contains many new data elements that reflect how data are collected at the state level. It should be noted that the handbook contains a comprehensive listing of all of the data elements that might be collected about individual students in a student record system. There is no federal mandate that all of the data elements be collected and maintained.



Select a system for assigning a unique identifier to each student.

A well-designed automated student record system must contain unique student identification numbers. Each number should be associated with only one student, and be used in every file with information about that student. This is particularly important if data will be kept in a longitudinal database. The unique identifier will enable information to be linked from different files for analytical or reporting purposes. Without such identifiers, it could be difficult to match records for students simply by using a name and birthdate. The need to move records from schools to districts to state education agencies has reinforced the need for a unique state student identifier system.



Some school districts have found themselves with various student identifiers used for different types of information about students. As a result, it is difficult to merge or link records for students when that need arises. Among the types of identifiers used are

1. family identifier, where the family is given a six digit number with the last number being a sequential number given to each child as he or she enters school;
2. food service number if the student is participating in the Free and Reduced Price Lunch Program;
3. special education number if special education services are being received;
4. assessment number, often assigned by the testing company;
5. vocational program number;
6. migrant program number;
7. school number, used in the information system at the school;
8. Social Security Number, often used to link social services to the student; and
9. state student identifier.

Examples of identifiers used by school districts

The importance of a unique student identifier in a school district is clear. When students move from one school to another, the identifier stays with the student, and information in the file can be merged and accessed as needed. As student records are transferred from the district to the state level, the unique student identifier becomes even more important. In order to have an effective system of unique student identifiers, there must be a locator system available in which all student names are kept along with key identification information so that matches between students and identifiers can be made. This locator



system, whether kept at the district or state level, should be designed to easily allow education staff to locate a student identifier for an enrolling student if one has already been assigned or to assign a new identifier if one is needed. A well-designed state-level student record system should be able to merge student files from year to year. In addition, the state-level system must be able to find students who have moved to other districts within the state. One advantage of such a system is that the state education agency can identify students previously misreported as dropouts.

There are four possible ways to assign unique state student identification numbers.

1. Social Security Number (SSN). Some states use the student's SSN as the unique identifier, since most children are now assigned SSNs at a very early age. In the states that use SSNs, an attorney general's opinion, legislative authority, or state board of education authority typically has been secured first. There are many advantages to using the SSN, which is generally considered unique on a nationwide basis. The assignment and maintenance of the SSN system is handled by the federal government; thus, the burden of determining an identifier and assigning it is reduced. The parent and student can assist in providing the SSN when transferring from one school to another, and it is easier for them to remember. When students move across states, those states using SSNs can easily verify records. Postsecondary application processes are also simplified when secondary schools can provide a SSN on transcripts. A further advantage is that SSNs can be used to share information or conduct studies across agencies that use it. Some states exchange family information across agencies to determine eligibility for services. On the other hand, some parents are uncomfortable providing their child's SSN, and others strongly oppose its use. Individuals *cannot* be required to provide a SSN except for a few purposes such as federal loan eligibility or tax status. A very small number of students will not have a SSN. To use SSNs, the state education agency would have to provide an alternative identifier to parents or students who refuse or are unable to provide it. Even if SSNs are not used as the identifiers, student record system planners should consider collecting and including them in the locator database. The added value afforded makes the effort worthwhile.

2. Algorithm to Assign Identifiers. An algorithm could be devised that encrypts the student's name, birthdate, gender, place of birth, and possibly other data elements to create a unique combination that can be used as a student identifier. The algorithm would be kept secure to protect the contents of the identifier. An advantage to using an

A unique student identifier will enable information to be linked for analytical and reporting purposes.



algorithm is that it can be distributed as a software application to schools for use at the time of registration. Parents and students would not have to know the identifier, and registrars would not have to contact prior schools. On the other hand, the required length of the identifier to ensure uniqueness might be excessive, and changes or mistakes in the data elements used would result in incorrect identifiers.

3. State-Assigned Identifiers. Some states have created a pool of identifiers and provided these to school districts for assignment to students. The number itself carries no meaning, except that it was assigned to the school district. The expectation is that this identifier will stay with the student as long as he or she remains in school in the state. Some states that use this method require only the student identifier (without the student's name) on the student record sent to the state education agency. The school district is responsible for ensuring that the correct identifier is always included in the student's record. In other states, the student identifier list is maintained by the state, and districts that receive a student transferring in from another district within the state can obtain the student's identifier through a locator system at the state education agency. One advantage of this type of identifier is that the state education agency controls the characteristics of the identifiers, and can verify their validity. Uniqueness is assured. Further, the identifiers can be kept separate from confidential data sources. A disadvantage of such a system is that school districts must rely upon the state education agency for their identifiers. Providing access to identifiers and ensuring the ability to assign them at registration requires sound management.

4. Locally-Assigned Identifiers. One way to use existing student identifiers is to assign a school and district identifier to the beginning of locally-assigned student numbers. One advantage is that local control is maintained. Districts are not required to make changes in their identifier system, and historical local files continue to be compatible with the identifiers. Also, an identifier can be assigned at the time of registration for new students. On the other hand, uniqueness across the state is not likely. Mobile students would receive a new identifier in each district/school. The formats and characteristics of local identifiers would have to be considered when establishing the parameters for acceptable identifiers. Because of these problems, this option has not generally been used for assigning state identifiers.

When choosing an identifier system, consider how the identifiers will be assigned and verified, while maintaining confidentiality.



STEP 6

Select a physical design that meets the needs of the users to get easy access and conduct analyses.



The following must be considered in order to select the most appropriate student identifier:

1. The level at which the identifier must be unique.
2. The burden of assigning numbers to existing students.
3. The need for verification.
4. The need for confidentiality.

Once you have determined what unique student identifier you will use, you should consider how schools receiving a student from elsewhere in the district or state will find out what is his or her identifier. States and school districts using unique identifiers have various solutions for making the number known to receiving schools; however, the easiest is to provide a locator system online protected by passwords. Such a system should contain key information about each student, such as name, birthdate, place of birth, race/ethnicity and sex, as well as the identifier. Some organizations also include the Social Security Number in the locator system, even if it is not to be used as the unique identifier. Having the SSN helps to ensure that the correct identifier is found if there are more than one student with the same basic information.

Determine the physical design of the student record system.

Data can be stored in many ways, ranging from hand-written paper documents, to microfilm or microfiche, to electronic data files on computer tape, removable disk (diskette), hard drive, or CD-ROM. A student record system could use any or all of the available media if it is feasible to link or access each type of medium. However, the most efficient student record systems have as much data as possible entered into a computer system, and the data are available online to those with a need to have access.

Several considerations are important in the selection of how your student data will be stored and accessed. These include the number and size of records, space available for storage, the permanency of the records, and the cost of storage. Cost has at least three components: the cost of entering the data or exchanging them between media; the cost of purchasing the components of the storage system, such as filing cabinets, computer disks, microfilming equipment, etc.; and the costs associated with ongoing maintenance, operation and training. Technical advances in computer data entry, storage, and retrieval are developing quickly, making these aspects of student records management less expensive, more efficient, less demanding of physical space, and more accessible to multiple users.

To identify the most efficient automated system for your student records, you will need to consider three things: software, hardware, and networks. Some of the important issues you will need to consider for these three areas are described below.

Step 6a. Select software.

Perhaps the most critical decision you will have to make is what software you will use, because software requirements generally determine what computer hardware you will need. You will need to determine if you can purchase off-the-shelf software or will need to have custom software developed to meet your needs. A careful review of existing software packages should be conducted before deciding that a custom solution is needed. The decision you make about software should be based on both your needs assessment and a consideration of several other things.

Some Questions to Consider When Deciding on Software

Questions	Answers
1. If you are a school or district, has a higher authority specified that you must use specific approved software? Some districts require all schools to use the same software package because there is a district package that can link the software for exchanging records within the district. Some states have approved only certain software packages because they support state reporting requirements. Also, you may be able to purchase software at a discount if you go in with other schools or districts.	
2. Is there a service bureau that can manage your student records for you? If you are a small school or district, it may be possible to hire a company to manage your student records. Cooperative agencies and regional service centers provide this type of support to school districts in some states.	
3. Do you have other types of administrative or instructional software that you want to be able to link with your student software for analytical purposes? If so, you will want to look at the standards used by the software, such as SIF (School Interoperability Framework) and ODBC (Open Data Base Connectivity).	
4. Does the software package under review restrict what data you may enter, or does it provide for user-defined fields? It is important to ensure that all of the data you want to maintain on students can be housed within the software and in the format that you desire or that is required for reporting to the state or federal government.	
	

Questions	Answers
5. Does the software package you are reviewing offer the reporting and analytical capability that you need? Many student record system software packages offer state reporting capability, albeit at a price. There are many advantages to having standard reports produced automatically by the software. Reporting requirements will be discussed more in Step 12.	
6. Does the software package you are considering receive high ratings from current users? What types of support are available from the software provider?	

Look for ways to build on the experiences of other organizations to improve your chances of obtaining an effective solution.



Step 6b. Choose hardware.

As mentioned above, if you are planning to buy hardware for your student record system, it is best to wait until you have identified the software solution you will be using. If, however, you will be restricted to using hardware that you already have, it is important to inventory your hardware, including the memory and storage capability that will be available to the student record software.

Step 6c. Design your network.

Chances are, you are planning to give quite a few people access to the student record system, including counselors, principals, teachers, registration clerks, and others. To do this efficiently, you should make the system available via a network. As you are planning for your system, you should consider what networking capabilities you currently have, and what networking capabilities you will need. If you currently have an open network, you may need to add security measures to ensure that unauthorized users cannot have access to student records. This is discussed more in Step 9.

The adoption of electronic means for maintaining student records is a big step for schools and districts that have been maintaining only paper records. However, it is a step worth taking, since computer files provide for more monitoring and analytical capability. Recent improvements in computer technology have resulted in huge amounts of memory being available in relatively low-cost machines. To obtain more specific assistance with the decision-making required for buying and implementing a technology solution for student record systems, you will want to refer to *Technology @ Your Fingertips*, a document designed for persons charged with making technology decisions in education organizations.

Identify the format for the data within the student record system.

The format of a student record is directly related to the characteristics of the storage medium. Paper records are often formatted to hold standard English words or numbers. Abbreviations may be used to save space, but generally the format is laid out to be easily read by a user. Even if paper documents are going to be used to store student data, there is an advantage to using data elements with standard definitions and coding conventions. These standards will help to ensure that the information collected is consistent with reporting requirements and other data collections.

Computerized records, on the other hand, capitalize on the use of codes rather than words, and even skip characters such as commas and decimal points to conserve space. A computerized record may look nonsensical to a reader without a code table and format description.

A computerized "data system format" is typically organized around these components:

1. **Files:** Groups of records of similar format (e.g., a collection of records for multiple students).
2. **Records:** The set of related data elements maintained about individual students.
3. **Data Elements:** Single pieces of information (e.g., Birthdate).
4. **Fields:** Specific areas (such as columns on a spreadsheet or punch card) in which the same type of information is regularly recorded. Fields are defined by exact positions of data elements in a record, such as positions 6-13 of an 80-character record reserved for a field containing the data element "birthdate," which might be coded as 10141989 (October 14, 1989).
5. **Options/Codes:** Symbols or abbreviations that can be translated into a meaningful value for the data element (e.g., the number 5 might stand for fifth grade).

As mentioned earlier, the *Student Data Handbook for Elementary, Secondary, and Early Childhood Education* contains recommended data element types and field lengths to be used by those designing computerized student record systems. The SPEEDE/ExPRESS format also contains data element characteristics.

A critical data element in an automated student record system is the student identifier, described in Step 5. This unique identifier allows components of a student's record to be merged or linked as needed even when data are maintained in different files and media.

You will want to include this type of information in your data dictionary as a means of helping to ensure data integrity.

STEP 7

Using standard formats for data elements helps to ensure that data are correct and interpretable.



STEP 8

One advantage of a well-designed student record system is that data must be entered only once for use by all persons with an established need to use the data.



Determine how you will enter or import data into the student record system.

Data must be put into the system. Paper systems accept data that are handwritten, typed, or printed out from computers. Entry into a computerized system can be direct, through keying or optical scanning, or through data importation from another source. SPEEDE/ExPRESS is an excellent example of electronic data interchange (EDI) as a method for moving records directly from one computer system into another.

The most efficient student record system requires data entry only one time. Instead of asking a parent to complete a paper form that requires a clerk to copy information onto a roster which is then keyed into a computer file, an ideal system might have the parent enter the data directly into the file via a computer terminal, or onto an optical scan form that can be read by the computer and placed in a file. Automated editing procedures could be used to ensure that valid information is entered, and can even allow for a clerk to edit or accept the information before a permanent entry appears on the official file.

As with other phases of data collection, entry, and use, it is important to ensure data confidentiality. Selecting those responsible for entering new or updated student data into the system must be done carefully, and they must be trained to maintain the confidentiality of the data. The previously mentioned document, *Protecting the Privacy of Student Records: Guidelines for Education Agencies*, contains recommendations for this area.

Whenever a child enters a school for the first time, a new record is created or is received from a school the student previously attended. Information is collected from parents the first time a child is enrolled, and that information is kept over time with additions and corrections made as the student progresses through school. Ideally when a student is transferred or promoted to a new school or transfers out of the district, the student record follows electronically so that the record can be entered directly into the receiving school's information system. This will help the receiving school to make appropriate placement decisions and ensure that data do not have to be collected again by the receiving district. Otherwise a new record must be created for the student.

When you implement a new student record system, you may identify data elements for which you do not currently have data. You will have to obtain this information from parents, the student or perhaps a staff member such as a teacher or counselor. Whenever you collect data, there are certain things you should consider in designing the form on which the data will be recorded. These guidelines are relevant even if the "form" is online.

Checklist for Collecting New Data	
Suggestion	Strategy
Make sure the purpose of the data collection is understood by the data provider.	
Provide clear instructions for completing the form, including specific instructions for individual items when necessary.	
Make definitions of data elements consistent with standard definitions for those data elements, when possible.	
Provide definitions for any words in the form whose meaning may be unclear.	
Use standard language and avoid jargon and abbreviations.	
Make sure that the technical terms used are appropriate for the data providers. Keep questions short and simple.	
Include check-off options whenever a complete list can be compiled.	
Examine each item on the form to be sure it is needed.	
Avoid sensitive or invasive questions where possible. When such items are necessary, careful wording and placement should be considered.	
Ensure that the requested information can be provided by the data provider.	
Minimize the amount of time data providers will need to complete the form.	
Registrars, principals, counselors, and even school secretaries are the ones who usually collect data about students initially. As a result, it is important that they are trained in the correct procedures for obtaining information from parents and students. Besides having a familiarity about what information is being requested and how it should be entered, they need to know how to deal with instances when no information is provided. For instance, if the parent declines to provide a response to race/ethnicity on a form, the person assisting with the form needs to know what to do. A major part of the training for these individuals is a focus on confidentiality of the data and their responsibility to maintain the data securely. Obtaining information from parents and students should be done in a manner than minimizes embarrassment or inconvenience. If you are moving data from an existing data system to a new data system, you will need to develop and test procedures to crosswalk the data from the old system into the proper locations in the new system. Whether or not the data	Training is critical to ensuring that data are consistently entered into the data system. 

STEP 9

FERPA requirements must be built into the system to ensure the confidentiality of student data.



entry is new or a crosswalk from the old system, once the data are entered into the system, you should do edit checks to ensure that answers are within the desired range, that there are no missing data, and that words are not misspelled.

There is more detail about data collection in the *Standards for Education Data Collection and Reporting* (SEDCAR). SEDCAR provides standards for effectively collecting and reporting education data.

Determine your procedures for providing access to the system.

In this step, the regulations, policies, and procedures detailed in Step 2 are implemented. Specific guidelines are set forth as a part of the *Family Educational Rights and Privacy Act of 1974* (FERPA). This law prohibits disclosure of information in student records, other than directory information, without student or parental permission except to:

- School employees who have a need-to-know;
- Other schools to which a student is transferring;
- Certain government officials in order to carry out lawful functions;
- Appropriate parties in connection with student financial aid to a student;
- Organizations doing certain studies for the school;
- Accrediting organizations;
- Individuals who have obtained court orders or subpoenas;
- Persons who need to know in cases of health and safety emergencies; and
- State and local officials or authorities if specifically required by a state law that was adopted before November 19, 1974.

Both policies and procedures are needed to ensure that only those with a "need-to-know" have access to student records. Policies should state who has access to specific types of data, particularly data of a sensitive nature that may be a part of the student record (either specific individuals or categories of staff, such as principals and teachers, etc.). In addition, they should state who will be allowed to update and revise student records, what security measures will be used to ensure limited access, and any penalties that will be imposed for abuse of this privilege. Policies should also address procedures for identifying and discarding information that need not be maintained permanently.

Procedures will include the assignment of passwords to allow access to data (either to particular data elements or categories of data) and to restrict unauthorized access. Distinctions should be made as to whether access is limited to viewing the data or being allowed to enter, update, and revise the data contained in the records. Your procedures should include cautions to ensure data cannot be accessed if the user leaves his or her desk for a few

minutes. These procedures need to be documented and training provided to persons who have access.

FERPA guarantees every student and/or his or her parents the right to inspect and review all of the education records maintained about the student by the school or school district. In addition, it guarantees the student and/or his or her parents the right to request that a school correct records believed inaccurate or misleading. This law further restricts the school or district from providing individuals or institutions with information from the student record without the permission of the student/parents. Schools must adopt a written policy about complying with FERPA, and notify parents and eligible students of their rights under this law. Information about FERPA requirements is included in the previously mentioned document, *Protecting the Privacy of Student Records: Guidelines for Education Agencies*.

Getting access to the data to use the information is a key aspect of a system. Earlier decisions about storage media and format are relevant to this step. Here it is important to describe how different users will gain access to and use the records. For example, if the storage medium is a file on a computer's disk, then access would be through a terminal or client computer, and users would have to have passwords giving them access to the file or portions of a file. The processing necessary to create reports would be done through software programs loaded on the host computer or on the user's computer.

Security also includes the measures put in place to ensure that records are not lost, stolen, vandalized, or otherwise rendered useless. Because physical security can never be assured with complete certainty, all data must be backed up by storage on a duplicate medium in a safe, fire-proof storage area. This could be as simple as storing a separate paper copy off-site, in a location not likely to experience the same disaster as the primary location. Computerized files lend themselves well to back-ups generated periodically and stored off site. You should check to see if your state has requirements about the storage of back-up data, as many states do. Extensive information about computer security can be found in the NCES document, *Safeguarding Your Technology*. This document contains guidelines for securing access to confidential files as well as guarding the technology itself.

It is important to ensure that individuals who need access to the student records have the equipment necessary to do their work, along with the security measures needed to restrict access to authorized users only. Whether in a paper or an automated system, policies need to be developed regarding access to the records to safeguard them from improper use.

Just as it is important to plan how data will be entered into the system, so too is it important to plan how and when data should be removed.



STEP 10

Staff should have a very clear understanding of the importance of maintaining high quality data.



Plan ways to ensure the integrity of the data in the student record system.

The most important aspect of this step is ensuring data quality. Everyone who comes in contact with the student record system shares in this responsibility. However, those individuals with the largest stake in data quality are most likely to make an effort to maintain the integrity and accuracy of the data. For example, high school registrars are known for maintaining accurate course-credit histories for students, because they have the primary responsibility for determining credits.

In planning a student record system, effort should be invested up front to ensure that everyone involved with the data system understands the importance of high quality data. Staff members should be encouraged to take ownership of each data file, and should be provided very clear criteria for maintaining high quality data. Each organization with a student record system should develop a schedule for updating or adding data elements that identifies when data elements are to be updated. For example, the schedule should state when a new school year's grade, school, and teacher information are to be entered for each student. Such a schedule is essential for timely and accurate calculation of official statistics for a report.

An essential part of this step is planning for the training of staff members who have the responsibility for entering and updating student records. Included in the training should be clear steps for how and when to enter the data, how to review data to determine accuracy, and how to report any problems that are identified. If staff members are new to computer usage, then training should include instruction in how to use the computer. It might help to videotape training if there is high turnover in data entry staff.

An important part of training should be a focus on why data integrity is important. A few carefully chosen examples showing the problems with inaccurate or incomplete data and resulting improper decisions can go a long way.

Using Training to Promote Data Integrity

One district implemented a new automated student record system that would require elementary school secretaries and principals to oversee data entry. Trainers for the system brought both secretaries and principals to learn together so that there would be more than one person in the school knowledgeable about the system. Training included basic computer information, such as how to turn on the computer, log on and call up the student record system. Because there was so much turnover in school secretaries, the district videotaped the training, and provided a copy to every school.

Plan procedures for doing standard and ad hoc analysis and reporting.

To the extent possible, it is good to have "canned" programs to produce reports that are done on a regular basis, such as attendance reports, program reports, and summary enrollment counts. Having these reports preprogrammed means that when they must be produced, someone can do a few simple steps to produce the reports. The turnaround time on these reports will be minimal, and there is a higher probability that they will be produced correctly, since the program will be the same one used previously. Care must be taken, however, that changes are made to the standard programs when reporting requirements change.

It is impossible, however, to anticipate every type of analysis or report that you may want to produce from your automated student record system. As a result, you will want to have the capability to do ad hoc reporting from your system. If possible, it is a good idea to build in this type of reporting capability so that extensive programming will not be needed at the time the ad hoc report is needed. The ad hoc capability can be built into your overall system, or you could extract data and do your analysis and reporting using a software package such as Excel, Access, SPSS, or SAS. Static analytical databases should be updated as needed, such as one or more times during the school year.

One area you should consider is whether or not you will be using a dynamic database for ad hoc analyses. If you do, you may have problems reproducing your results, since the database may change between analyses. Many school districts and state education agencies prefer to use "point-in-time" or static databases for their analyses. Often these static databases include only a subset (or extract) of the data in the full student records. One advantage to using extract files for doing analyses and reporting is that you may be using a smaller data set than the entire population of your organization. If you must use all of your student records, you may need to run your reports after work hours so that computer time will not be taken away from others who need to use the system.

As with other steps, it is important to provide training to persons who will be producing the reports if they are not the ones responsible for programming the system. Clear documentation of the steps required for producing the report is helpful. In addition, it is a good idea to have staff members available to assist when reports are being produced in case something should go wrong.

STEP 11

Develop canned programs for standard reporting. Ad hoc reporting capability is also useful.



Consequences of Poor Data Quality

One large city school district discovered that large amounts of state and federal money were not received one year because of errors in how the data were maintained in the student record system and how the reports were produced. Since individual student records were sent to the state education agency, it was important that all relevant program participation be noted on the student records. That year, when the records were sent to the state, no one bothered to do basic checks on program participation rates and other relevant statistics. Consequently, it was not noticed that there were no students coded as Title I program participants, resulting in the loss of many dollars for the district.



Make sure that information about individual students cannot be viewed in reports.



Develop procedures for appropriate reporting of student data.

The final step focuses on other cautions related to the use of data from student record systems that must be addressed. When reporting aggregate information about student participation in a program (e.g., special education or Title I), safeguards must be in place to prevent individual student information from becoming known to anyone without proper authorization. The importance of such safeguards cannot be overstated since FERPA restricts the disclosure of individual student information.

One common error made by organizations that produce a variety of reports is to report specifics on groups of students so small that they can be identified individually from the data. Often these organizations produce specific reports with counts of students by type (such as by grade level by race/ethnicity by sex). If you look at school data, you may see that there is one Hispanic female in grade six. Later, when assessment results are available, the organization produces a school summary with percentages of students by type who have passed the test or average student scores by student types. While the latter (assessment) reports may mask the number of students in each category, it is possible to use the former (enrollment) reports to see that the Hispanic female in grade six made a specific grade and/or passed the test. Thus, it is important to establish procedures for identifying where information about the identity of specific students can be obtained. In this instance, assessment reports should not be released if the student grouping contains fewer than three persons.

It is a good idea to have someone "eyeball" the data before it is published. Compare the data to other sources, such as last year's data, to see if there are major differences that cannot be explained. If the data do not look correct, then

the procedures used to run the report should be checked and the report rerun. It is far better to delay the publishing of correct data than to publish incorrect data in a timely fashion.

Inappropriate Release of Confidential Data

The parents of a first-grade student decided to have their child take an optional standardized test. One other first-grade student in the same school took the test. When average scores by grade for the school were published, the average for the first graders taking the test was included, even though only two students took the test. As a result, the parents of each of the two first graders were able to figure out the score made by the other student.

Summary

With proper planning and management, a student record system can be a valuable resource to many people, ranging from parents and local school officials to researchers and policy-makers. While many of the decisions concerning design and implementation are made only once, it is important to note that some aspects of planning and management are recurring and must be reviewed regularly to ensure long-term effectiveness.

- Whenever data are entered into the system, care must be taken to promote data integrity. Suggestions in Steps 8 and 10 should be heeded on an ongoing basis.
- Similarly, procedures for security and providing access, discussed in Step 9, must be continuously updated and monitored to ensure the confidentiality of student records.
- The needs of users will change over time. Thus, you will need to review Step 1 on a periodic basis to be sure that the system is meeting the needs of the users.

Following the steps in this booklet will help those who are designing and managing an automated student record system to make the best decisions to maximize usefulness while protecting confidential information.



Resource List

A Pilot Standard National Course Classification System for Secondary Education. [NCES #95-480] This document was developed to promote the use of a standard vocabulary and to encourage the maintenance of accurate and complete data about students. It is intended to serve as a reference document to public and private school agencies and researchers interested in course information at the secondary level. This publication contains no data. For ordering information, go to <http://www.ed.gov/pubsearch/pubsinfo.asp?pubid=95480>

Basic Data Elements for Elementary and Secondary Education Information Systems. [NCES #97-531] This document contains a set of basic student and staff data elements recommended by the Core Data Task Force of the National Forum on Education Statistics. The purpose of these basic data elements is to provide a common language to promote the collection and reporting of comparable education data to guide policy and assist in the administration of state and local education systems. The report also contains a recommended process for identifying and periodically updating the set of data elements to be maintained by a school, school district, state education agency, or other education unit with a need for student and staff information. Available online at <http://nces.ed.gov/pubs97/97531.pdf>

Protecting the Privacy of Student Records: Guidelines for Education Agencies. [NCES #97-527] These guidelines were developed to help state and local education agencies and schools to develop adequate policies and procedures to protect information about students and their families from improper release, while still satisfying the need for school officials to make sound management, instructional, and service decisions. Suggested audiences include state education agency staff, state and local policy-makers, school district staff, school administrators and staff, program and support services staff, technical staff, and teachers and other school-based support professionals. Available online at <http://nces.ed.gov/pubs97/97527.pdf>

Safeguarding Your Technology: Practical Guidelines for Electronic Education Information Security. [NCES #98-297] These guidelines are written to help education administrators and staff at the buildings, campus, district, and state levels better understand why and how to effectively secure their organization's sensitive information, critical systems, computer equipment, and network access. Available online at <http://nces.ed.gov/pubs98/safetech>

Schools Interoperability Format information is available from the Software and Information Industry Association at <http://www.siiia.net/sif>



SPEEDE/ExPRESS (SPEEDE stands for Standardization of Postsecondary Education Electronic Data Exchange, and ExPRESS stands for Exchange of Permanent Records Electronically for Students and Schools.) is an ANSI X12 (Electronic Data Interchange) format. For information on SPEEDE/ExPRESS look under Standards on the website of the Postsecondary Standards Council at <http://www.standardscouncil.org>

Standards for Education Data Collection and Reporting. [NCES #92-022] Guidelines are available that describe "best practice" in collecting and reporting education data including student information. Called the Standards for Education Data Collection and Reporting (SEDCAR), these guidelines were developed pursuant to the Hawkins-Stafford Amendments of 1988, which authorized an effort to improve the comparability, quality, and usefulness of education data. SEDCAR is a helpful guide to basic principles for ensuring good quality in the key phases of data collection, storage, and reporting. Anyone developing, redesigning, or taking charge of a student record system can benefit from the collective experience of the large team of professionals brought together to develop SEDCAR. To order SEDCAR, please visit the NCES web site at <http://www.nces.ed.gov/pubsearch/pubsinfo.asp?pubid=92022>

Student Data Handbook for Elementary, Secondary, and Early Childhood Education: 2000 Edition. [NCES #2000-343] The Student Data Handbook was developed to provide guidance concerning the consistent maintenance of student information. This handbook defines data elements and definitions describing personal information, enrollment, school participation and activities, out of school experience, assessment, transportation, health, special program participation and discipline for pupils in early childhood, elementary, and secondary education. This handbook contains no data. Available online at <http://nces.ed.gov/pubs2000/studenthb>

Technology @ Your Fingertips: A Guide to Implementing Technology Solutions for Education Agencies and Institutions. [NCES #98-293] These guidelines describe a process for getting the best possible technology solution for your organization. It also describes the steps necessary to identify technology needs, acquire the technology, and implement a technology solution that provides a foundation for an organization's future technology well being. Available online at <http://nces.ed.gov/pubs98/tech>



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